SOIL SURVEY OF SUMTER COUNTY, ALABAMA.

By WILLIAM G. SMITH and F. N. MEEKER.

LOCATION AND BOUNDARIES OF THE AREA.

Sumter County lies in the west-central part of Alabama, the State line forming its western boundary. Its eastern boundary, which is extremely irregular, is formed by the Tombigbee—a very crooked river. On the south lies Choctaw County, and on the north Pickens County. Sumter County is 47 miles long, from 9 to 33 miles wide, and has an area of approximately 900 square miles. It lies within the physiographic province known as the Gulf Coastal Plain, which is popularly known as the agricultural section, in contradistinction to the northeastern two-fifths of the State, called the mineral region.

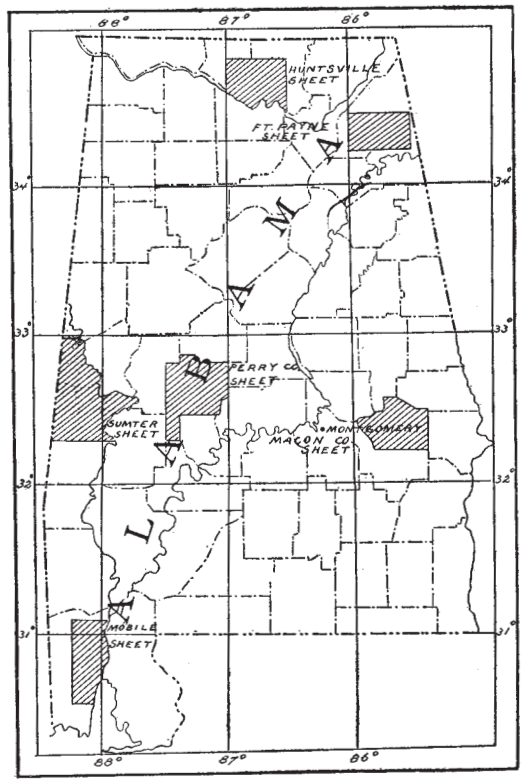

FIG. 12.—Sketch map showing location of the Sumter County area, Alabama.

This soil survey was made by plane-table surveying—the road map and location of the different soil types having been made together as the field work progressed. The original land survey maps (1830–1832), on record at Livingston, the county seat, were referred to in making up the township and section lines.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The section including Sumter County was ceded to the National Government by treaty with the Choctaw Indians, September 27, 1830. A survey of the land into townships and sections was at once

begun, and the land was sold to settlers. In a comparatively short time white settlemen was well advanced, and on December 18, 1832, Sumter County was organized.

The early settlers came mainly from the South Atlantic States, many coming from central and eastern North Carolina.

The agriculture practiced by the pioneers did not differ much from that of the Indians, for they, too, grew corn and potatoes for domestic consumption, and depended for their meats largely upon game, which was then plentiful. By 1840, however, considerable attention was given to growing cotton. The plantations were located mainly along such navigable streams as the Tombigbee River, and by 1860 some large plantations were being operated, having as a part of their working force from 50 to 500 negro slaves. The changes wrought by the civil war, of course, checked any further agricultural development by deranging labor conditions, and many of the large estates have been divided. During the last two decades, however, marked activity has taken place in lumbering, followed by increased activity in agriculture and the development of special interests in small fruit and truck growing.

CLIMATE.

The climate is that of the warm Temperate Zone of the United States. The winters are short and mild, the summers long and warm. This condition admits of a wide range of crops, and gives a long period for tilling the soil. Crops of some sort can be grown almost the year around.

The range of temperature for the year is from 20° F., in winter, to 100° F., in summer. The average winter temperature is about 40° F., and that of summer about 80° F. The high relative humidity frequently prevailing serves, however, to intensify the sensation of cold or heat, and from June to September there are often long periods of oppressively hot weather.

The soil seldom freezes to a depth of more than an inch or so, and then only for a few hours, or at most days. Snow seldom falls, and when it does it soon melts away.

The average date of the last killing frost in spring is March 12, and of the first killing frost in fall, November 8.

The annual precipitation is about 50 inches. Most of the precipitation comes during the winter, spring, and early summer months, averaging from 4 to 5 inches a month, while during September, October, and November, or the period during which the bulk of the cotton crop is ready for picking, the precipitation amounts to only about 2 or 3 inches a month. The rainfall is usually so well distributed that serious droughts are seldom experienced. The rainfall in summer is usually in the form of showers of short duration. On the

other hand, long-continued rains in winter and spring sometimes result in seriously washing and gullying the hilly areas, and in flooding the stream bottoms and level uplands.

The following table, made up from the Weather Bureau records, includes stations which are believed fairly to represent the climatic conditions of Sumter County. It shows the normal monthly and annual temperature and precipitation:

Normal monthly and annual temperature and precipitation.

Month.	Meridian, Miss.		Livingston, Ala.		Pushmataha, Ala.		Newbern, Ala.	
	Temperature.	Precipitation.	Temperature.	Precipitation.	Temperature.	Precipitation.	Temperature.	Precipitation.
	° *F.*	*Inches.*	° *F.*	*Inches.*	° *F.*	*Inches.*	° *F.*	*Inches.*
January	47.0	5.15	.....	4.00	45.7	4.80	45.4	4.40
February	53.6	5.81	49.0	4.78	49.0	5.72	47.2	5.55
March	54.5	5.55	55.8	5.14	57.9	5.81	56.8	5.10
April	65.6	4.37	64.8	3.07	64.6	5.61	66.6	4.75
May	71.4	4.79	73.0	3.08	73.6	4.28	73.6	4.18
June	77.6	6.24	79.3	4.58	79.4	4.64	79.6	3.85
July	78.6	5.43	81.4	4.50	81.0	5.00	81.7	4.47
August	77.8	4.46	80.3	4.00	80.6	4.05	81.4	5.05
September	73.0	2.83	75.9	2.48	75.4	2.52	76.6	2.46
October	65.0	1.65	63.7	1.85	64.6	2.02	65.4	1.78
November	53.4	3.09	54.7	2.88	56.1	3.10	55.1	3.00
December	50.5	5.29	46.8	4.70	48.6	4.34	47.8	5.02
Year	63.6	54.66	.....	45.06	64.7	51.89	64.8	49.61

PHYSIOGRAPHY AND GEOLOGY.[a]

The surface of Sumter County is moderately hilly and broken. Such level tracts as do occur are found mainly in the central and northern parts of the county, in what is termed the "prairie section." The elevation above sea level ranges from 100 to 200 feet. The drainage is almost entirely toward the Tombigbee River on the east. Into this flow a great number of streams, having mainly an easterly or southerly direction. Of these the more important are the Sucarnochee River, Alamuchee Creek, Kinderbish Creek, and Noxubee River, which, with their many branches, completely drain the county.

Sumter County lies within that comprehensive physiographic region known as the "Coastal Plain." Four geological divisions found in this part of the plain give character to the soils. Beginning with the oldest or lowest, these are the Rotten limestone, the Sucarnochee clay, the Lafayette, and the Late Pleistocene.

The Rotten limestone is itself a subdivision of the Cretaceous, consisting of an impure limestone stratum, with the surface exposed in

[a] The matter pertaining to the geology of the area is based mainly on the Report on the Geology of the Coastal Plain of Alabama, 1894, by Eugene A. Smith.

many places and underlying the whole of the remainder of the county. Its thickness seems to range from about 300 to 600 feet. It owes its origin to an offshore deposit laid down in a rapidly deepening sea during the latter part of Cretaceous time. Its texture is that of a loosely coherent limestone containing from 50 to 75 per cent of lime carbonate and 25 to 50 per cent of clay. This rock is exposed more or less throughout that part of the county lying north of the Sucarnochee River, and where exposed gives rise to two distinct soil types, namely, Houston black clay and Houston clay. Both are locally termed "prairie land," the former, however, being usually designated as "black prairie," and the latter as "lime hill prairie" land. The clay is lighter colored, the surface is more hilly, and the lime rock is possibly more often exposed in the latter type.

There are some areas of the Rotten limestone which have the calcium carbonate and clay in such proportions as to make excellent cement, and there is a factory at Demopolis that manufactures cement out of the lime rock of that locality with success. Some of the Rotten limestone also has a considerable proportion of phosphate.

The Sucarnochee clays are exposed as a belt 4 or 5 miles wide extending through the county in a northwest-southeast direction, and mostly lying contiguous to the Sucarnochee River. They are a subdivision of the Lignitic of Lower Tertiary age. Two soil types are derived from this formation that are locally spoken of as "flat-woods post-oak" and "hilly post-oak." These appear in this report under the type names Lufkin clay and Lufkin clay loam, respectively.

The Lafayette, a sand and clay formation of Pleistocene age, is an interesting and important geological formation occurring chiefly in the southern part of the county, where it almost completely overlies the two formations already described, while throughout the remainder of the county it occurs as a capping here and there with considerable definiteness. It is locally spoken of as "sandy land," and, as may be readily inferred from its position, it modifies and gives character to most of the soils of the county.

Four distinct soil types are derived from the Lafayette, namely, the Orangeburg sand, Orangeburg fine sandy loam, Norfolk fine sandy loam, and Orangeburg clay, while indirectly it has modified the character of some of the other upland soils and contributed to the formation of the bottom lands.

The Late Pleistocene, or Recent, is the youngest formation in the county, forming the closing chapter in the geological history of this section. It probably includes all of the Norfolk sand, the Sassafras sandy loam, the Waverly loam, and Meadow, which in this county are all bottom-land types.

The drinking water of the area is obtained mainly from two sources—surface wells, from 10 to 50 feet in depth, and artesian wells,

from 300 to 1,100 feet in depth. The water from wells sunk in the Lafayette formation is usually good, except as it may be contaminated from the surface. Some of the water from wells in the Sucarnochee clay is highly charged with mineral salts, among which magnesia in the form of Epsom salts is often prominent. Mineral water of like character was noted also in a well sunk in the clay overlying the Rotten limestone. These waters are often shipped to Birmingham, Meridian, and other points and used for medicinal purposes.

In the northern half of the county there are a number of artesian wells. Most of these are flowing wells, while from the rest the water is easily drawn by hand pumps. These artesian well borings are progressively deeper going from north to south, those in the vicinity of Warsaw, Ivy, and Gainesville being from 300 to 700 feet in depth, while at Epes and Livingston the depth is from 800 to 1,100 feet. The water from the artesian wells in the northern part of the county contains relatively small quantities of the mineral salts, while that of the wells at Epes and Livingston is very highly impregnated.

The presence of these flowing wells may some day prove very valuable in connection with the irrigation of truck or other special crops.

SOILS.

Twelve soil types were recognized in Sumter County, most of them being old-established types. The following table shows the actual and relative extent of each type:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Orangeburg fine sandy loam.	107,264	18.8	Sassafras sandy loam	33,408	5.8
Waverly loam	100,288	17.5	Houston black clay	26,648	4.9
Houston clay	59,048	10.2	Meadow	21,952	3.8
Lufkin clay loam	52,928	9.3	Norfolk sand	15,296	2.7
Lufkin clay	49,088	8.6	Orangeburg clay	12,800	2.2
Norfolk fine sandy loam	48,128	8.4	Total	571,456	
Orangeburg sand	44,608	7.8			

ORANGEBURG SAND.

The Orangeburg sand consists of about 8 inches of dark-brown sand, underlain by a brown to red sand from 3 to 10 feet or more in depth. This, in turn, often grades into a red sandy clay, and the nearer the surface this occurs the better the type is for farming. The better phases often grade rapidly into the Orangeburg fine sandy loam type.

A large area of the Orangeburg sand occurs northwest of Gaston,

where it is locally known as "sand-tuck" land, and another extensive area is found west of Belmont. It occurs in smaller areas in other parts of southern Sumter County.

The type forms a distinct upland, with a surface rather hilly and rolling. The stream valleys are deep, and, as a rule, the sides are steep. By reason of its elevation, open texture, and abundance of natural drainage ways, it is well drained, and rather inclined to suffer from drought during dry weather. The Orangeburg sand is derived from the deep sand of the Lafayette formation. There may be areas which have resulted from the sandy clay, where the clay particles have been removed by drainage waters.

The mineral constituent of the type is mainly quartz sand. The reddish color, due to the presence of red iron salts, is one of the characteristics separating this type from the Norfolk sand, which it resembles very much in texture.

The Orangeburg sand is naturally suited to the growing of truck crops, but at the present time the transportation facilities and market conditions do not favor any extended development of this industry. In the better phases of the type—those having an admixture of red clay in the subsoil, as is the case where this soil grades into the Orangeburg fine sandy loam—the staple crops, such as cotton and corn, are grown with moderate success. Peaches do well on some of these better areas. Cotton yields from one-fourth to one-half bale per acre, and corn from 5 to 15 bushels per acre.

The sandier phases of the type still remain in forest, supporting a scrubby growth of oak and often a fair stand of shortleaf pine. Little of the type is improved, and its value is low, ranging from 50 cents to $2 an acre.

The following table gives the results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Orangeburg sand.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11317	1 mile SE. of Intercourse.	Gray loose sand, 0 to 10 inches.	1.1	14.1	21.5	37.9	12.5	9.0	3.7
11315	6 miles S. of Epes	Brown sand, 0 to 10 inches.	1.7	20.0	17.1	27.8	7.1	18.9	7.3
11316	Subsoil of 11315	Brown sand, 10 to 36 inches	2.7	20.3	17.0	28.0	8.0	15.9	7.9
11318	Subsoil of 11317	Red sand, 10 to 36 inches.	1.6	39.3	19.2	20.9	6.2	1.7	10.9

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam consists of 8 to 15 inches of gray sandy loam, underlain by a red sandy clay. The subsoil material varies in thickness from 5 to 50 feet or more, resting then either on a cross-bedded sand or sometimes on a heavy bluish clay. The red sandy clay is usually more or less cemented with iron and stands up readily in wells, curbing being unnecessary. In a few places some gravel is found, but except in rare instances not enough to influence the texture of the soil or to be of economic importance. The surface soil is invariably loose and easily tilled under almost all conditions of moisture.

The Orangeburg fine sandy loam occurs in broad areas throughout the southern third of the county, where the Lafayette covering is almost continuous, and in scattered areas throughout the remaining northern part of the county wherever there are remnants of the Lafayette sand and clay overlying the Rotten limestone. The surface of the type is rolling to hilly, with rather steep-sided stream valleys. The drainage is very good. The loose open soil favors the ready absorption of the rainfall, and the sandy clay substratum seems well adapted to storing and retaining it for the use of crops.

The Orangeburg fine sandy loam is derived from the sandy and clayey materials of the Lafayette formation. In Sumter County it is by far the most extensive of the Orangeburg series of soils, which series has been found in other soil surveys to be derived mainly from this geological formation.

Besides being adapted to the growing of the staple crops, the type is well suited to the truck crops and to peaches and strawberries. Trucking and fruit growing are now carried on at York and Livingston, where the transportation facilities are better. In central Georgia this is one of the types of soil preferred for peaches.

The crops commonly grown on the Orangeburg fine sandy loam in Sumter County are cotton and corn. The yield of cotton averages from one-fourth to three-fourths bale per acre, and of corn from 15 to 25 bushels. Recently more attention has been given to the growing of forage crops, and where care is taken to manure and fertilize the fields and to rotate the staples with leguminous crops these yields are considerably increased. It is said by those having wide experience with sandy soils in this section that even this, the best of the upland sandy types, requires abundant manure and fertilizer, systematically applied, to make farming profitable.

A considerable part of the Orangeburg fine sandy loam is cleared and farmed. The remainder supports a stand of shortleaf pine. The value of the land varies, according to the state of improvement, location, and value of standing timber, from about $5 to $12 an acre.

The following table gives the results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Orangeburg fine sandy loam.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11323	½ mile N. of Intercourse.	Gray sandy loam, 0 to 15 inches.	0.4	4.6	14.1	40.4	15.4	19.7	5.3
11321	5½ miles NW. of Gainesville.	Gray sandy loam, 0 to 12 inches.	.9	6.2	8.8	22.5	13.3	39.7	8.3
11324	Subsoil of 11323	Red sandy clay, 15 to 36 inches.	.1	3.0	10.8	33.9	12.3	17.0	22.8
11322	Subsoil of 11321	Red sandy clay, 12 to 36 inches.	1.1	4.9	7.9	20.2	10.6	29.6	25.5

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam differs from the Orangeburg fine sandy loam in that it has a yellow sandy clay instead of a red sandy clay subsoil. The texture is the same throughout the profile, the soil consisting of 8 to 15 inches of gray sandy to fine sandy loam and the subsoil of a yellow sandy clay that extends to a depth of 36 inches or more.

The Norfolk fine sandy loam is not very distinct in this area, and it often grades rapidly into the Orangeburg fine sandy loam. Its total area is relatively small, although some considerable tracts are found in the southern, central, and northern parts of the county. Hixon, on the Alabama Great Southern Railway, is the center of the largest area.

As a rule, the surface of the Norfolk fine sandy loam seems to be rather flatter than that of the Orangeburg fine sandy loam. It is fairly well drained naturally, and only some of the more level areas require artificial draining, which is readily effected by means of open ditches.

The Norfolk fine sandy loam is probably derived mainly from the Lafayette formation. The soil is composed largely of quartz sand, and is not very retentive of moisture. The subsoil, containing varying quantities of clay and silt, maintains a much better moisture condition. The type has not the inherent productiveness of the types having the red sandy clay subsoil.

This type seems fairly well adapted to the growing of the staple crops. Cotton yields from one-fourth to one-half bale per acre and corn from 5 to 20 bushels. The forage crops yield fairly well. Small

fruits, such as strawberries, and truck crops, like English peas, snap beans, cabbage, and sweet and Irish potatoes, are also successfully grown where liberal applications of fertilizer are used.

The following table gives the results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Norfolk fine sandy loam.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11311	3 miles SW. of Livingston.	Gray sandy loam, 0 to 15 inches.	1.2	3.0	4.9	21.3	19.3	42.2	7.7
11309	10 miles NW. of Gainesville.	Gray sandy loam, 0 to 15 inches.	1.1	2.2	4.0	26.8	20.9	31.2	13.5
11312	Subsoil of 11311	Yellow sandy clay, 15 to 36 inches.	1.1	2.5	4.0	18.5	15.1	42.7	15.9
11310	Subsoil of 11309	Fine sandy loam, 15 to 36 inches.	1.5	2.6	3.8	22.6	17.4	34.9	17.2

ORANGEBURG CLAY.

The Orangeburg clay consists of from 4 to 8 inches of reddish sandy loam, underlain by red clay, or, in some cases, slightly sandy clay. The soil in places may have quite a clayey texture, forming clods if plowed when too wet, or it may be a more typical fine sandy loam where it grades into the Orangeburg fine sandy loam, which occurs wherever the ordinarily shallow surface soil exceeds a certain depth.

The Orangeburg clay occurs only in relatively small areas. These are scattered throughout the county, occurring in conjunction with the sands and clays of the Lafayette, from which the soil is derived.

The surface is often rather flat, though hilly and rolling areas are also found. In the main the natural drainage is good, and artificial drainage, where necessary, may be readily effected by means of open ditches.

The Orangeburg clay is said to be the most productive soil of the series. It retains moisture well and is well adapted to the production of the staple crops. Small fruits and vegetables can also be grown successfully, but the staple crops—cotton, corn, and forage—together with stock raising, are probably the best lines of agriculture to be practiced.

Under the ordinary methods of culture, where only a moderate amount of fertilizer is applied, cotton yields on an average from one-

half to three-fourths bale per acre, and corn from 15 to 30 bushels. The yields of the forage crops are very good.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Orangeburg clay.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11329	3 miles NE. of Ramsey.	Brown sandy loam, 0 to 6 inches.	2.0	13.9	9.1	16.5	11.2	27.3	20.1
11327	1½ miles of Sumterville.	Red loam, 0 to 6 inches...	.4	1.1	1.1	12.6	26.0	22.2	36.2
11330	Subsoil of 11329.....	Red sandy clay, 6 to 36 inches.	.7	11.7	9.6	15.9	11.3	24.9	26.3
11328	Subsoil of 11327.....	Red clay, 6 to 36 inches...	.1	.5	.5	12.1	22.4	17.3	47.0

HOUSTON BLACK CLAY.

The Houston black clay, or "black prairie land," as it is locally called, consists of from 4 to 8 inches of a brown to black clay loam, underlain by a brown to gray or grayish-white clay 3 to 10 or more feet in depth. This material rests directly on Rotten limestone. The greater part of the soil of this type is black, the brown color occurring only in the elevated and better drained areas. The subsoil of these areas is also a lighter gray, and in places the limestone is exposed.

The Houston black clay occurs in considerable areas in the central and northern parts of the county, in what is known as the "black prairie," or canebrake belt. It is much interrupted by areas of Houston clay, as well as by areas of the more sandy types.

The surface of the Houston black clay is comparatively flat, but, as a rule, the soil is well drained naturally, and only a few instances were noticed where artificial drainage was required.

The Houston black clay owes its origin to the weathering of the Rotten limestone—a very impure limestone, of a loose structure, containing from 25 to 50 per cent of clay. Over some areas the limestone has a covering of gray jointed clay, probably deposited while the rock was under the sea. Where this clay is found it has probably entered into the formation of the Houston black clay, but by far the greater part of the type has been formed from the residue of the limestone left through the solution of the calcium carbonate in rainwater and modified by other agencies of weathering.

In some areas of the type there are many shells from 1 to 3 inches in diameter. There are also in many places concretionary nodules,

from one-fourth to 1 inch in diameter, said to be high in lime and phosphate, but probably a more prominent feature throughout the soil and subsoil of all the type is the mottling of the clay with small beadlike bodies having the appearance and texture of the Rotten limestone. The character and abundance of these shells and nodules have an important influence on the texture of this clay land, as they make it more friable. The breaking down of these materials may also have some effect on the productiveness of the type. It is the experience of the farmers that little if any benefit is derived from the addition of mineral fertilizer to this land, but where stable manure and other vegetable manures have been used and leguminous crops grown its productiveness is decidedly increased. Crops have been grown and good yields obtained continuously on many farms on the Houston black clay for many years without the use of fertilizers, thus attesting the great natural fertility of the type.

The Houston black clay has a tendency to bake and become difficult to plow, while if plowed when too wet large clods are formed that do not easily disintegrate. Failure to apply vegetable manure and to grow leguminous crops to loosen up the soil increases this tendency. Experience with areas which have been neglected in these ways has shown that, as a rule, the surest and quickest way of putting the soil in good tilth again is to plow the land in the fall, thereafter harrowing or stirring it with a cultivator only when the moisture conditions are right. Even if the soil be too dry at the fall plowing the winter rains are likely to assist much in the melowing process.

The Houston black clay seems especially well adapted to the growing of forage crops, and is therefore very well suited to the live-stock industry, which is being considerably extended. The staple crops—cotton and corn—also produce well on this type. These crops have been grown continuously for over half a century in some parts of the county with good success. The yields average from three-fourths to over 1 bale of cotton, and from 20 to 50 bushels of corn per acre. In recent years considerably more attention has been given to the growing of grasses and forage crops than formerly. Johnson grass, alfalfa, and sweet clover (*Melilotus alba*) are prominent varieties. The latter two yield from 3 to 6 tons per acre, with two or three cuttings a season. Many farmers object to seeding their lands to Johnson grass, because it spreads rapidly and is very difficult to eradicate when once it gains a foothold. It is very troublesome in the cotton and corn fields.

Practically all of the Houston black clay is cleared and under some form of cultivation. Good farm houses and other substantial improvements are often seen on the type. Its value ranges from $5 to $15 an acre.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Houston black clay.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11291	1 mile W. of Geiger.	Black loam, 0 to 8 inches.	2.3	3.2	2.9	9.6	11.4	55.8	14.9
11295	6 miles S. of Gainesville.	Black clay loam, 0 to 6 inches.	.5	1.7	1.4	4.9	5.1	57.9	28.5
11293	2 miles S. of Gainesville.	Black clay, 0 to 6 inches.	1.2	1.6	1.4	5.1	5.3	42.2	43.2
11296	Subsoil of 11295	Dark clay, 6 to 36 inches.	1.1	2.0	1.9	6.9	5.7	54.6	28.0
11292	Subsoil of 11291	Dark to gray clay, 8 to 36 inches.	3.2	3.9	2.3	6.0	7.0	47.7	29.9
11294	Subsoil of 11293	Black clay, 6 to 36 inches.	.6	1.8	1.6	5.4	4.3	49.0	37.6

The following samples contain more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 11291, 4 per cent; No. 11292, 18.3 per cent; No. 11295, 1 per cent; and No. 11296, 1.5 per cent.

HOUSTON CLAY.

The Houston clay consists of from 4 to 8 inches of brown to almost white clay loam, underlain by a brown to gray or grayish-white clay, which often rests on the lime rock at a depth of 18 to 36 inches. The type differs from the Houston black clay, mainly in that it is lighter colored, the surface is more hilly, and the limestone is more often exposed. It is often spoken of locally as the "lime-hill prairie," in distinction from the more level prairie occupied by the Houston black clay.

Important developments of the Houston clay occur east and northeast of Livingston, west of Gainesville, and around Epes and Sumterville.

The type, being rather hilly, is naturally well drained, and there is seldom any need of artificial drainage. Like the soil just described, it is derived from the weathering of the Rotten limestone, and the difference in the two types is due to dissimilarity in the surface and drainage conditions and the consequent condition as regards organic matter. The surface of the Houston clay not being favorable to the accumulation of water, the growth of vegetation has been less, and the organic matter resulting from its decay has been insufficient to blacken the soil. Then, too, the system of cropping, with clean cultivation, leaving the soil unprotected from year to year, has favored

washing of the fields, exposed the underlying rock, and further depleted the supply of vegetable mold.

In mineral constituents the Houston clay is doubtless identical with the Houston black clay, and the statements made in the description of the latter type apply here with equal force. Mica fragments, however, seemed more frequent in the subsoil of this type than in the Houston black clay.

Except in very dry seasons the staple crops, cotton, corn, and forage crops, are grown quite successfully on this type. The nearness to the surface of the underlying lime rock is the principal cause of droughtiness in many areas, while the more thorough surface drainage is an important factor in the lessened moisture supply throughout the type. With a fair amount of rainfall, however, the type yields well, and the indications are that this is naturally nearly as productive a type of soil as the Houston black clay. Where there is a fair depth of soil and subsoil the yield of cotton is considerably better than on the black prairie areas, the lower humus content of the Houston clay being an advantage in the production of this crop, as a less bushy growth of plant and a more abundant fruiting are induced, even in wet seasons.

As a rule, however, the type is not well adapted to such clean culture crops as cotton, corn, etc., for the reason that washing and gullying are apt to be severe. As a result, exposures of the underlying rock are being extended, the depth of the soil covering reduced, and the land as a whole is becoming more subject to drought. Some system of cropping in which the land is plowed only at relatively long intervals is needed on this type, and the growing of forage crops, coupled with stock raising, is probably the best line of agriculture to be followed where this soil is the predominating type. Sweet clover seems to have a root system that adapts itself very well to shallow soils, growing very well even on the almost bare lime rock. The clover may be cut for hay, but where the rock is much exposed it is better to use the land for pasture. That part of the type having considerable depth of soil and subsoil is much improved by the growth of leguminous crops, as shown by the increased yield of succeeding crops of cotton, corn, and grasses.

The proportion of the Houston clay now under cultivation is considerably less than in the case of the Houston black clay, and the average value is lower, prices ranging from $2 to $8 an acre.

The table on the following page gives the results of mechanical analyses of typical samples of the Houston clay.

Mechanical analyses of Houston clay.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11299	1 mile S. of Epes	Brown loam, 0 to 6 inches	2.7	2.3	2.4	10.2	8.1	57.0	17.4
11301	1 mile NE. of Livingston	Brown loam, 0 to 6 inches	.6	1.1	1.2	20.0	20.3	34.0	22.4
11297	2 miles NE. of Sumterville	Brown clay loam, 0 to 6 inches	1.6	2.5	1.8	8.3	9.0	42.1	34.3
11302	Subsoil of 11301	Loam, 6 to 36 inches	.8	1.3	1.6	23.2	20.0	31.6	21.4
11300	Subsoil of 11299	Yellow silty clay, 6 to 36 inches	.7	1.5	1.3	6.6	5.2	58.5	25.8
11298	Subsoil of 11297	Gray clay, 6 to 24 inches	.8	1.6	1.1	8.2	10.8	32.6	45.1

The following samples contain more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 11297, 24 per cent; No. 11298, 76 per cent; No. 11299, 16 per cent; No. 11300, 8.1 per cent; No. 11301, 4.8 per cent; and No. 11302, 53.1 per cent.

LUFKIN CLAY.

The Lufkin clay consists of from 3 to 6 inches of dark-gray, sticky clay loam or clay, underlain to a depth of 3 feet or more with an exceedingly sticky mottled red and gray clay subsoil.

The type includes chiefly lands locally known as "flat-woods post oak," and occurs as a broken band 4 or 5 miles wide extending through the county in a northwest-southeast direction. The surface is very flat and poorly drained.

The Lufkin clay is derived from the Sucarnochee formation, a subdivision of the Lignitic, which itself is a division of the Lower Tertiary. It is a stiff, impervious clay, very hard to drain or cultivate. Under certain conditions it can be plowed fairly well, but the range of moisture content with which cultivation can be carried on satisfactorily is so narrow that utilization of the type from year to year is very uncertain. It could doubtless be considerably improved in respect of this refractory condition by the application of stable manure or the plowing under of green crops, which would have the effect of making the clay less compact and thus more easily drained. The application of crushed limestone would also improve the mechanical condition of the type, at the same time adding a mineral in which it seems to be deficient.

Very little of the Lufkin clay is as yet under cultivation. Much of it is still covered with the native forest growth, consisting of shortleaf pine and small oaks, the latter of a size suitable for fence posts.

Cotton and corn are grown on this type, and give good yields in favorable seasons. Cotton yields from one-half to over 1 bale per

acre, and corn from 10 to 30 bushels, and this, too, under quite ordinary cultural methods. With better methods, including manuring and liming, these yields could be considerably increased. Under the present conditions of agriculture, however, with large areas of other and more easily tilled lands, no very extensive improvement of this type can be expected in the near future, though as soon as the population becomes greater and lands generally come into greater demand this clay will be brought under cultivation. For the present the type serves best as a stock range. The cleared areas should be kept as much as possible in some of the grass crops, Johnson grass and Japan clover having been found valuable. This will eliminate the necessity for plowing the land except at long intervals. The grass can be pastured or cut for hay, according to circumstances. The forested area usually contains an undergrowth of grass and shrubbery suited to stock. Where the merchantable timber has been cut, the value of the Lufkin clay ranges from 25 cents to $1 an acre.

The following table gives the results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Lufkin clay.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11345	5 miles W. of Sumterville.	Gray clay loam, 0 to 6 inches.	0.8	5.7	4.2	14.7	7.6	43.1	23.9
11347	7 miles W. of Sumterville.	Dark-gray clay, 0 to 6 inches.	.1	1.4	.9	3.0	3.3	62.5	28.6
11349	5 miles NW. of Coatopa.	Dark-gray clay, 0 to 4 inches.	.8	4.3	3.1	8.7	4.9	38.4	39.9
11348	Subsoil of 11347	Gray clay, 6 to 36 inches	.1	.9	.5	1.7	2.6	52.8	41.4
11346	Subsoil of 11345	Gray clay, 6 to 36 inches	.8	3.0	2.4	7.1	4.3	32.3	50.0
11350	Subsoil of 11349	Gray clay, 4 to 36 inches	.3	2.5	2.1	4.5	3.3	29.7	57.6

LUFKIN CLAY LOAM.

The Lufkin clay loam consists of from 4 to 8 inches of gray loam or clay loam, underlain by a sticky, mottled gray clay. It is locally included with the preceding type, as "post-oak land," but differs from it in being rather more hilly, slightly lighter textured, and much easier to cultivate.

The type occurs in broken bands lying between the Lufkin clay and some of the sandy types. It also occurs to a considerable extent throughout the prairie section of the county, adjacent to the sandy types, where much of it is under cultivation.

Owing to the more rolling surface of this type it is naturally much better drained than the preceding type, while the more open texture of the soil makes artificial drainage by open ditches more effective.

The Lufkin clay loam owes its origin apparently to a mixture of silt and sand of the Lafayette formation with those of the Sucarnochee clay formation, and its mineral constituents are very similar to those of the Lufkin clay.

The range of moisture conditions within which this soil admits of tillage is considerably wider than that of the preceding type, and as a consequence much of it is cultivated every year; but it will clod if plowed when too wet, while if very dry the subsoil, which the plow must penetrate, makes plowing extremely difficult, if not impracticable. A deficiency in lime is also ascribed to Lufkin clay loam, as in the case of the preceding type. Hence the addition of lime and vegetable manure in the same manner as suggested for Lufkin clay would doubtless be very beneficial to this type also.

The type is very well adapted to the staple crops, and in the lighter phases to strawberries and some truck crops. The yields of the staples are good. Cotton yields from one-half to nearly 1 bale per acre, and corn from 15 to 40 bushels. Grasses, leguminous, and other forage crops yield well, and if used systematically in rotation with the staple crops the yields could be made much better than at present.

Some good and fairly well improved farms are to be found on this soil. Its average value is considerably above that of the preceding type, ranging from $2 to $6 an acre. The portion still in forest supports a good stand of shortleaf pine and small, scrubby oak.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Lufkin clay loam.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11341	1 mile E. of Ramsey.	Yellow loam, 0 to 10 inches.	1.4	4.2	3.3	23.0	12.1	36.9	18.8
11339	1 mile S. of Geiger ..	Loam, 0 to 5 inches.....	3.1	5.9	3.3	11.6	7.8	46.5	21.8
11343	4 miles W. of Bellamy.	Silty clay loam, 0 to 6 inches.	1.5	3.3	2.8	4.7	3.4	50.4	33.8
11342	Subsoil of 11341	Mottled-red clay, 10 to 36 inches.	.5	2.6	2.2	14.4	6.3	33.7	40.5
11340	Subsoil of 11339	Gray clay, 5 to 36 inches .	1.5	2.8	1.7	6.0	5.2	40.8	41.9
11344	Subsoil of 11343	Gray clay, 6 to 36 inches .	.5	2.6	1.9	3.0	3.6	36.5	51.9

NORFOLK SAND.

The Norfolk sand consists of from 4 to 8 inches of loose gray to dark-brown sand, underlain by a loose brown to whitish sand 3 feet or more in depth. The soil and subsoil are composed mainly of quartz sand. The first few inches are stained somewhat by organic matter, while the brown color sometimes seen in the subsoil is probably due to the presence of iron salts.

This type of soil occurs as deep sandy bottoms along the Tombigbee and Sucarnochee rivers, and other streams of this character. Sometimes it is in the form of elevated ridges not unlike second bottom, and again it is found as broad, flat, low-lying areas. Even in the latter situation, owing to its open texture, it is usually well drained, and for this reason is apt to be droughty in dry weather.

The Norfolk sand is derived from the Pleistocene sands of comparatively recent origin, being due in part to the action of streams when these flowed at a higher level than at present. During excessive floods some parts of the type are still being built up by the addition of sediments. This is especially the case in river necks where the flood water flows rapidly and directly across to some lower bend in the river.

The type is naturally adapted to truck growing, but requires the application of large quantities of vegetable and mineral manures in order to make it productive. Since the market for truck crops is as yet comparatively undeveloped in this section, not much of this soil is under cultivation. When used at all it is generally as part of a field composed mainly of some of the more productive types.

The following table gives the results of mechanical analyses of typical samples of the Norfolk sand:

Mechanical analyses of Norfolk sand.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11303	8½ miles NW. of Gainesville.	Gray sand, 0 to 8 inches...	0.4	4.4	14.3	41.0	12.9	22.7	4.2
11305	3 miles SE. of Epes..	Brown sand, 0 to 10 inches.	.3	5.9	17.8	43.9	10.8	5.8	15.5
11304	Subsoil of 11303.....	Gray sand, 8 to 36 inches.	.4	4.2	13.5	38.2	11.1	25.6	6.5
11306	Subsoil of 11305.....	Yellow sand, 10 to 36 inches.	.2	5.3	17.5	46.2	12.7	6.1	12.0

WARSAW SANDY LOAM.

The Sassafras sandy loam consists of from 8 to 15 inches of fine sandy loam, underlain to a depth of 36 inches or more with a fine sandy clay subsoil brown to yellow in color. The color of the soil is usually brown or light brown, with variations toward a dark gray in the lower depressions. The texture in the latter areas may also be rather silty, the lighter texture being found on the slightly higher elevations.

The type occurs mainly as second bottom terraces along the Tombigbee River and some of its tributary streams, in areas varying in width from one-fourth to 1 mile and in length from 1 to 5 miles. These areas are usually bounded on one side by the upland escarpment and on the other by the lower lying bottom.

The surface is usually flat, but by reason of the texture of its soil and subsoil and its elevated position the type is quite well drained naturally. It is overflowed only in cases of unusually high water.

The Sassafras sandy loam is derived from materials of Pleistocene age. It appears to have been laid down in the stream valleys of Cretaceous age with much the same structure as now found.

The Sassafras sandy loam is naturally quite productive and most of it is cleared and cultivated. It is well adapted to the growing of staple crops and to many of the truck crops. On the more elevated areas small fruits and peaches do very well. Cotton yields from one-half to three-fourths bale per acre, and corn from 10 to 20 bushels. The grasses, clovers, leguminous plants, and other forage crops produce very well.

The following table gives the results of mechanical analyses of typical samples of this soil:

Mechanical analyses of Sassafras sandy loam.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11333	2¼ miles NW. of Gainesville.	Gray sandy loam, 0 to 12 inches.	0.1	1.3	3.7	35.3	19.1	33.4	7.2
11337	4 miles SW. of Coatopa.	Brown sandy loam, 0 to 15 inches.	1.2	2.7	3.7	25.3	26.9	27.5	12.5
11335	2½ miles SW. of Fairoaks.	Brown sandy loam, 0 to 10 inches.	.3	.7	2.4	52.5	17.4	13.9	12.7
11334	Subsoil of 11333	Sandy clay loam, 12 to 36 inches.	.2	.9	2.6	22.9	17.1	33.2	22.8
11338	Subsoil of 11337	Stiff clay, 15 to 36 inches.	.0	1.4	3.2	19.2	26.7	19.5	30.0
11336	Subsoil of 11335	Red sandy clay, 10 to 36 inches.	.1	.5	.8	23.0	13.0	23.5	39.3

WAVERLY LOAM.

The Waverly loam consists of from 8 to 10 inches of dark-brown silty or fine sandy loam, underlain by a brown clay or heavy silty loam. As a rule the texture follows pretty closely the above description, but it may vary, on the one hand or the other, toward a rather heavy clay or toward a sandy loam, in which latter case it may grade rapidly into the Sassafras sandy loam.

The type occurs as first bottom land along the rivers and creeks of the area. The surface is quite flat, as a rule, though occasionally there are broad elevations having a slightly rolling surface, and here the soil may contain a little more sand than in typical areas.

Owing to its rather level surface the Waverly loam frequently needs drainage. This may usually be effected by means of open ditches, which can be led into some natural channel close at hand. As a rule, the type is readily drained when the streams are at their normal stage. It lies from 5 to 20 feet above the normal level of the streams, and some of it is subject to overflow nearly every year. The remainder is overflowed only at rare intervals.

The Waverly loam owes its origin mainly to deposition of silt and clay from the flood waters of the streams, and in this way it is being built up from time to time. Each overflow adds more fertility to a type already quite rich, judging from the crop yields, in the humus and mineral salts needful to plant growth.

A large proportion of the type is cleared and under some form of cultivation. The lower lying areas are often covered with forests, which consists mainly of deciduous trees, such as gum, sycamore, water oak, beech, and willow. The rank growth of switch cane usually found in these forested portions of the type affords excellent wild pasture for live stock in winter as well as in summer.

The staple crops, cotton and corn, as well as the forage crops, are well suited to this type. Cotton yields from three-fourths to 1 bale or more per acre, and corn from 20 to 40 bushels. Cotton and corn are planted after the greatest danger from floods has passed. The high water usually occurs in February and March, but in some years floods come as late as June, and then practically all planted crops are destroyed. Many of the grasses are not injured by the floods, and the type is adapted to such perennial crops.

The table on the following page gives the results of mechanical analyses of the soil and subsoil of this type.

Mechanical analyses of Waverly loam.

No.	Locality.	Description.	Fine gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
11287	1 mile W. of Gainesville.	Loam, 0 to 10 inches	0.3	1.4	2.0	17.2	20.8	41.3	17.0
11285	3¼ miles SE. of Epes.	Loam, 0 to 8 inches	.1	.3	1.3	24.3	22.2	30.8	20.8
11288	Subsoil of 11287	Gray silty clay, 10 to 36 inches.	.4	2.7	1.6	15.8	20.9	31.4	27.1
11286	Subsoil of 11285	Clay to sandy loam, 8 to 36 inches.	.1	2.8	8.1	14.7	9.7	28.7	35.2

The following samples contain more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 11286, 13 per cent; No. 11285, 18 per cent. The locality where these samples were taken receives the wash from the adjacent lime-hill prairie lands, which probably accounts for the greater lime content found here than in other parts of this soil type.

MEADOW.

The Meadow, like the preceding type, is first bottom land, but as it lies at less elevation above the streams and is thus more subject to overflow, it was deemed advisable to recognize it as a separate type. Much of it is often locally called "swamp." It consists of from 4 to 8 inches of a dark silty or fine sandy loam or clay loam, underlain to a depth of 36 inches or more with a brown to mottled-gray clay. As a rule, it is somewhat heavier in texture than the Waverly loam, the "black waxy clay" phase being more prominent in the Meadow than in the other type.

This soil is not so extensive as the Waverly loam, being limited to some of the lower depressions of the first bottom of the Tombigbee River. The largest area is found north of Black Bluff landing.

The surface being low and flat, the type is not naturally well drained. Then, too, it is at present heavily forested, which retards surface drainage. By the aid of open ditches, however, the type can be readily drained when the Tombigbee River is not above its normal stage. This soil is the first to be overflowed during any general rise of the flood waters, and scarcely a season goes by but these bottoms are more or less flooded, while by reason of the inadequate natural drainage even heavy rainfalls flood the surface.

Owing to its mode of origin, the building up of the low bottoms with fluvial sediments, the type is well supplied with organic and

mineral elements of fertility, and these are being added to from season to season.

Scarcely any of this type is cultivated, nearly all being in forest. This consists of water oak, gum, sycamore, beech, willow, and originally cypress, but the latter has nearly all been removed by lumbermen.

The type, as far as tried, produces very good crops of cotton, corn, and the grasses and other forage crops, but because of the danger from overflow very little use is made of it. At present it is used mainly as wild pasture for cattle and hogs, and for this purpose it serves very well. The tall switch cane affords excellent browsing during winter. The live stock must be carefully watched, however, for considerable loss may result by drowning if sudden floods occur.

AGRICULTURAL METHODS.

The cultural methods followed for cotton are about the same as those followed elsewhere in the Gulf States. The land is given a shallow plowing either in the fall or spring, the soil being thrown into ridges 3 or 4 feet apart, following contours on the hillsides. The seed is planted from the middle of March to the middle of April, being dropped along the tops of the ridges, usually with a horsepower cotton planter, which opens up the furrow, drops the seed, and covers it, all in the same operation. Sometimes the furrow is opened up with a small shovel plow, and the seed dropped by hand and covered with a plank scraper.

Deeper plowing of the cotton fields, say from 6 to 8 inches instead of the usual 3 or 4 inches, would be a great improvement over the present practice. This would insure a better covering of the surface litter left from preceding crops, placing it where it would more readily decay and be converted into plant food. The mechanical condition of the soil would also be improved, a greater proportion of the rain water would be absorbed, and with less surface water to run off washing and gullying would be reduced. All these factors would tend to enable the preparation of a better seed bed.

A common method of cultivating cotton and corn is to run a shovel plow or "diamond scooter" between the rows, throwing the soil against the plants. Instead of this a better practice would be to give these crops level, shallow cultivation, stirring the soil 2 or 3 inches with a modern harrow-toothed two-horse cultivator. By the present method the crops are often injured by too severe pruning of the roots, while by the method advised, which gives a more complete cultivation of the surface, the roots are not injured, the weeds are just as effectively destroyed, the soil moisture is more surely conserved, and the soil is left in a fine porous structure favoring the absorption of a larger part of the rainfall.

While the student of agriculture finds some progress in the methods of cultivating cotton, he can not but be struck by its insignificance as compared with changes that have taken place in the methods of handling the product after it has been harvested. The horse-power gin and the old buzzard-wing press have largely been displaced by improved machinery operated by steam. The cotton is unloaded from the wagon by suction tubes, and after being ginned the lint and seed are separated and carried by air pressure to the storage bin and the press. Hand labor has been almost entirely eliminated, while the cotton tests a grade or so higher than under the crude earlier methods, owing to the removal of a greater quantity of the dirt and dust formerly left in the bale. It seems strange that the growers have not more generally profited by this object lesson and made those changes in the culture of the crop which have been so often recommended and are so palpably needed.

The planter still depends largely on commercial fertilizer to produce his crop of cotton or corn. From $15,000 to $20,000 is expended annually for this fertilizer in Sumter County. Cowpeas, oats, sweet and Japan clover, Johnson grass, Bermuda grass, and other forage crops are grown, but usually no systematic rotation calculated to increase the productiveness of the soil is followed. If the clean-culture summer crops, like cotton and corn, were followed in the fall by seeding some of the forage crops, needed additional food for the work stock would be provided, the productivity of the land not only conserved but increased, and all at a considerable saving in the outlay for fertilizers. In short, deep plowing, the growing of more forage crops, the practice of fixed rotations, and the raising of more live stock are the important factors in a well-balanced agriculture suited to the region. Cotton must remain, for the present at least, the chief money crop, and the changes recommended above can be made in such a way as not to decrease, but rather to increase, its production and the profit derived by the planter from its cultivation.

AGRICULTURAL CONDITIONS.

Sumter County is sparsely populated, having about 36 persons to the square mile, of whom only about one-fifth are white. In the southern part of the county, where the lands consist mainly of the sandy types of soil, the white and colored races are about evenly divided, while in the northern part, or "prairie section," the colored population largely outnumbers the white. The planters are, on the whole, in quite a prosperous condition.

According to the Twelfth Census there were 5,140 farms in Sumter County, but this does not represent the individual holdings, as the census classed each tract farmed by a tenant as a "farm." As the tenant system largely prevails, the number of farms, as ordinarily

understood, must be very much below the figures quoted. Fifteen per cent of the farms enumerated are operated by the owners, all the others, with the exception of about 2 per cent operated by part owners or managers, being farmed under some system of tenantry. Aside from the large proportion of farms operated by tenants, a striking feature of the condition of the county as to tenure of farm lands is the relatively large number of cash tenants, who, according to the authority quoted, operate 67.9 per cent of the total number of farms.

According to the last census the average size of farms is 79.1 acres, but this is also misleading, because of the classification of each tenancy as a farm. On the basis of ownership there are several farms containing from 500 to 2,000 acres, and the greater number are probably from 200 to 400 acres in extent.

The labor is largely colored. It is chiefly unskilled, and in some sections, owing to the higher wages offered by the lumbering interests, difficult to secure. The conditions, on the whole, are such as to discourage investments or enterprises that must depend for their success chiefly on hand labor.

The value of the annual products not fed to live stock is, according to the Twelfth Census, $1,947,694, of which total cotton, the most important product, is credited with about three-fourths. Cotton is grown pretty generally throughout the county, large shipments being made from several points on the Tombigbee River and from the railway towns of Cuba, York, Coatopa, Livingston, and Epes. Corn ranks next in importance, having a value of about $30,000. Oats, Irish potatoes, sweet potatoes, miscellaneous vegetables, sugar cane, sorghum cane, peas, and peanuts represent a value of about $300,000, according to the same authority.

During the last decade there has been a considerable increase in the production of truck crops, especially at Cuba, and to some extent around York and Livingston. The shipments of English peas, snap beans, cabbages, and sweet and Irish potatoes from Cuba alone have an estimated value of from $25,000 to $50,000 annually. This industry was started by local enterprise and is being extended. The small-fruit interests at present are centered mostly at York and Livingston. In good seasons from $10,000 to $15,000 worth of berries are shipped. As a rule fairly good profits are reported by the strawberry and truck growers, and there is room for a considerable extension of these industries.

The annual value of forest products, lumber, cross-ties, etc., is given by the census report as $16,589, which is probably less than their value in the last few years. There are two large sawmills in the county, located at Sumter and Bellamy, which are equipped with improved high-grade machinery, and whose output is very large. In

addition there are several smaller ones of the portable type in operation in different parts of the county. Pine and oak lumber is the chief output of all these mills. There is still some cypress in the area, but the supply is almost exhausted.

In connection with the foregoing enumeration of the principal crops it may be well briefly to review the soils and their crop adaptations. This feature is, of course, brought out in the consideration of the soil types earlier in the report, but a short synopsis here is deemed advisable because of the importance of this subject in a report of this kind.

The Orangeburg sand is naturally a truck soil, but in this county it is rather too distant from railway service to be used for trucking. Some of the phases having a heavier subsoil are good for peaches and pears, but the same objection to its use for these products applies as in the case of truck. In favorable seasons fair yields of the staple crops are secured.

The Orangeburg fine sandy loam occurs extensively throughout the county, and is quite productive of the staple crops, cotton and corn, as well as truck and fruit crops. It is mainly on a similar type of soil that the great peach industry of central Georgia has been developed.

The Norfolk fine sandy loam is not naturally quite so productive as the Orangeburg fine sandy loam, but by manuring and proper crop rotation it can be made to produce large yields of the staple crops as well as of fruits and truck crops. In eastern North Carolina the Norfolk fine sandy loam is noted for its adaptability to the production of a thin yellow leaf tobacco.

The Orangeburg clay occurs to only a limited extent in the county, but it is naturally productive and well adapted to the staple crops, cotton and corn, as well as to various kinds of forage crops suited to the live-stock industry.

The Houston black clay, locally known as " black prairie," is naturally the most productive of the upland soils. Cotton and corn are grown almost continuously without fertilizer. Forage crops produce exceptionally well, thus materially favoring an extension of the live-stock industry.

The Houston clay is similar in origin to the preceding type, but it is lighter colored, the surface is more hilly, and the type somewhat less productive, though cotton, corn, and forage crops produce very well, and the type is also well suited to the live-stock industry.

The Lufkin clay loam possesses fair natural fertility and produces moderately good crops of the staples grown. It is, however, very sticky when wet and very hard and difficult to handle when dry, and is not regarded with so much favor as the two preceding types.

The Lufkin clay is considerably heavier in texture than the preceding type, and is therefore even more difficult to till. At present

very little is cultivated. Where it has been put in fair condition, with favorable seasons, it gives good yields of cotton and corn, but it is naturally better adapted for permanent pasture land. A valuable crop for grazing purposes is Japan clover, or Lespideza, which is said to do well on this soil.

The eight types above considered are all upland soils. The four following are bottom-land types:

The Norfolk sand occurs as first and second bottom lands, and is adapted to the culture of truck crops, watermelons, etc. It is not very productive of the staple crops, though these are grown to a limited extent on the better areas.

The Sassafras sandy loam occurs mainly as second bottom land, and is quite productive of the staple crops, the yields being nearly as good as on the Orangeburg fine sandy loam. Truck crops, like sweet potatoes, melons, etc., and also peaches, produce very well. Most of this type is under cultivation.

The Waverly loam occurs as first bottom land, and is the most productive of the bottom-land types. Much of the type is used in the growing of cotton, corn, and forage crops, for which it is very well adapted.

The Meadow consists of lower lying areas along the streams that are still in a more or less swampy condition. It is not used for cultivated crops, and is covered for the most part with forest and an undergrowth of cane, which furnishes considerable grazing.

The transportation facilities for much of the county are as yet rather inadequate. The southern part of the county is reached by the Alabama Great Southern Railway and the Southern Railway, the former affording connection with a through-line service from New Orleans to New York and other points north. The northern portion of the county has no nearer railways than those just mentioned.

The Tombigbee River is navigable for large boats about three or four months in the year, from January to April. This service, however, is quite uncertain and unsatisfactory at present. The construction of locks is under consideration, with a view to making the river navigable the year round.

The wagon roads of the county, both public and private, are rather poor, but a definite movement is being made this season (1904) to improve them. A bond issue of $120,000 has been voted for road improvement. A careful study of the available material near at hand suitable for road building has been made by those having the matter in charge, and improved road machinery, consisting of reversible road machines, heavy horsepower rollers, etc., has been purchased by the county.

From the foregoing it may readily be inferred that the market conditions for the greater part of the county are at present not very good. The local market for agricultural products is small. Cuba, York, Epes, Gainesville, and Livingston, with populations ranging from 400 to 900, are the principal towns in the county.

With the promised improvement of the wagon roads and the building of the new railway line projected through the north end of the county, better markets, both local and distant, will open up. Until the transportation facilities are improved, however, there will be little opportunity to specialize the crops recommended for the lighter types of soil, and the principal products must continue to be cotton, corn, and live stock, all of which can be handled without especially rapid transit facilities. If any extended development of the fruit or trucking industry is to take place, except immediately along the present railroads, canning, pickling, or distilling factories will have to be built in the locality where the products are grown.

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U S DEPT OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

ALABAMA
SUMTER COUNTY SHEET

SOIL PROFILE
(3 feet deep)

Orangeburg sand — S / S
Norfolk sand — S / S
Orangeburg fine sandy loam — Ssc / C
Norfolk fine sandy loam — Ssc / C
Warsaw sandy loam — Ssc / C
Waverly loam — Ssc / Sicc
Orangeburg clay — Ssc / C
Houston clay — Scc / C
Lufkin clay loam — Sc / C
Lufkin clay — Scc / C
Houston black clay — Scc / C

LEGEND
S Sand
Ssc Sandy loam
Sicc Silty clay
Sc Fine sandy loam
Scc Fine sandy clay
Sicc Heavy silt loam
C Clay
Scc Clay loam
Sc Loam

LEGEND
Os Orangeburg sand
Ns Norfolk sand
Of Orangeburg fine sandy loam
Nl Norfolk fine sandy loam
Sl Warsaw sandy loam
Wl Waverly loam
Oc Orangeburg clay
Hc Houston clay
Li Lufkin clay loam
Lc Lufkin clay
M Meadow
Hb Houston black clay

Soils surveyed by
William G. Smith and F. N. Meeker
1904

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1904